

### REMARKS

Claims 11-19 are pending in the present application.

At the outset, Applicants wish to thank Examiner Teskin for the indication that the rejection over JP 9-302014 has been withdrawn (paper number 9, page 2). Reconsideration is requested in view of the following remarks and the amendment set forth above.

The rejection of Claims 1-16 under 35 U.S.C. §103 over Arai et al (USP 6,235,855) is obviated by amendment.

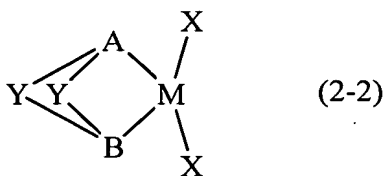
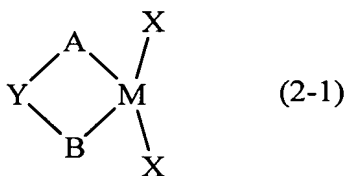
Arai et al disclose a transition metal compound that is useful as a catalyst in the production of an aromatic vinyl compound polymer or an aromatic vinyl compound-olefin copolymer (see Abstract). As the Examiner properly notes, the disclosure of Arai et al differs from the present invention in that “the copolymerization catalyst is formed of a transition metal compound with a metallocene skeleton having one crosslinking group formed exclusively of a carbon-carbon crosslinking skeleton, instead of two cross-linking groups” (paper number 5, page 3, lines 1-4).

The present invention is based, in part, on Applicants’ discovery that some bis-bridged transition metal compounds, in which at least one crosslinking group is of a carbon-carbon crosslinking skeleton, have a special significance in achieving a high activity in the copolymerization of an  $\alpha$ -olefin and an aromatic vinyl compound. Such an advantageous result would not be obvious in view of the disclosure of Arai et al.

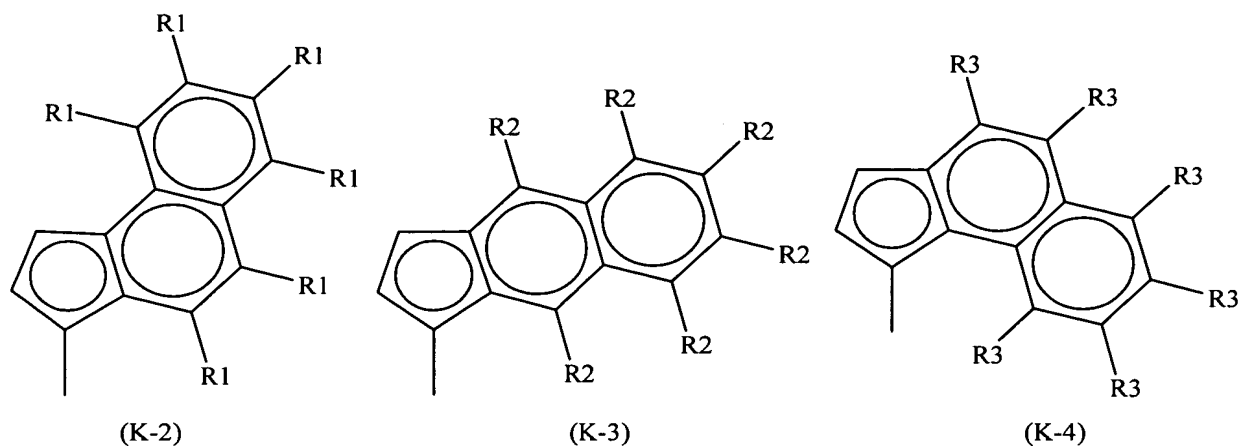
At column 5, line 61 to column 9, line 46, Arai et al disclose innumerable alternatives for Y, as well as thousands of conceivable compounds spanning hundreds of generic catalyst classifications, including several bis-bridged transition metal compounds in which at least one

crosslinking group is of a carbon-carbon crosslinking skeleton (col. 9, lines 21 et seq.) as the Examiner indicates (paper number 5, page 4, lines 1-3). However, Arai et al continually disclose that the preferred, or even required, catalytic compound to give rise to their desired result is a transition metal compound with a metallocene skeleton having *one* crosslinking group.

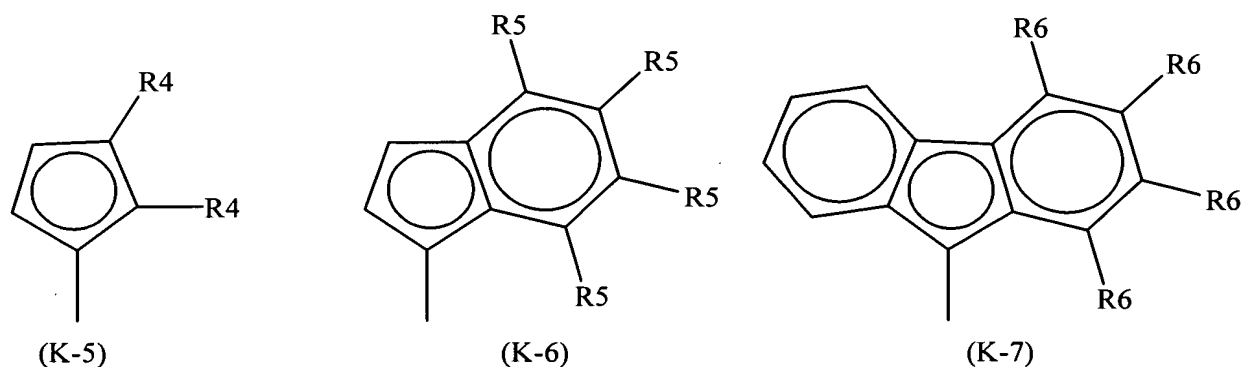
Despite the aforementioned disclosure by Arai et al, the Examiner presumably points to column 8 and asserts that the “innumerable alternatives for bridging group Y are narrowed considerably when taking into account the teachings of Aria directed to production of an aromatic vinyl compound-olefin copolymer having a vary high aromatic vinyl compound content.” The Examiner asserts that a transition metal component having a bite angle of at most 120° would be employed and that this bite angle can be accomplished in a compound of formulae (2-1) or (2-2) when Y is a methylene group having hydrogen or a C<sub>1-15</sub> hydrocarbon group. Be that as it may, at columns 3-4 Arai et al specifically define the scope of substituents A and B of the compounds of formulae (2-1) and (2-2). For the Examiner’s convenience, formulae (2-1) and (2-2) are reproduced below:



As defined in Arai et al, A is an unsubstituted or substituted benzindenyl group of the following formula K-2, K-3 or K-4:



B is an unsubstituted or substituted benzindenyl group of the same chemical formula as A, or an unsubstituted or substituted cyclopentadienyl group, an unsubstituted or substituted indenyl group or an unsubstituted or substituted fluorenyl group, of the following formula K-5, K-6 or K-7:



In present Claim 11, the substituents for the cyclopentadienyl group and the indenyl group have been limited to a monovalent hydrocarbon group, a halogen atom, an alkoxy group, a silicon-containing monovalent hydrocarbon group, a phosphorus-containing monovalent hydrocarbon group, a nitrogen-containing monovalent hydrocarbon group, or a boron-containing monovalent hydrocarbon group. In contrast, ligand A (as set forth above) of

Arai et al is an unsubstituted or substituted *benzindenyl* group of formula (K-2), (K-3), or (K-4). Therefore, the compounds of Arai et al are distinct from the present invention.

Moreover, Applicants submit that the compounds disclosed by Arai et al cannot even qualify as homologs of the present invention. The Federal Circuit has defined the parameters that may be considered in determining the proper use of chemical structure as the basis for obviousness rejections under 35 U.S.C. §103 in *In re Jones*, 21 USPQ2d 1941 (Fed. Cir. 1992) (**copy enclosed**). The court cited the following examples of relationships that have given rise to a *prima facie* case of obviousness:

triorthoesters and tetraorthoesters;  
stereoisomers;  
adjacent homologs and structural isomers; and  
acid and ethyl ester (*Id.*, at 1943).

In the present case, there exists no motivation to modify the compounds disclosed by Arai et al to contain any of the claimed protection groups of the claimed compounds because Arai et al is silent in this regard and because the relationship between the claimed compounds and those disclosed by Arai et al fail to satisfy any of the above-mentioned relationships to be defined as homologs by the Federal Circuit.

In view of the foregoing amendment and comments, Applicants request withdrawal of this ground of rejection.

The rejection of Claims 1-16 under 35 U.S.C. §103 over EP 0721954 is obviated by amendment.

EP 0721954 discloses a transition metal compound useful as a catalytic compound for olefin polymerization (see Abstract). According to EP 0721954, such a transition compound

is used in the homopolymerization of an  $\alpha$ -olefin and the copolymerization of an  $\alpha$ -olefin with another  $\alpha$ -olefin. However, at no point does EP 0721954 disclose or suggest employing their catalytic compound for the copolymerization of an  $\alpha$ -olefin and an aromatic vinyl compound.

Applicants note that the  $\alpha$ -olefin-aromatic vinyl copolymerization in the presence of the alkylene/silylene bis-bridged metallocene catalyst or the alkylene/alkylene bis-bridged metallocene catalyst was not known in the art at the time of the present invention. Applicants submit that aromatic vinyl compounds are chemically quite different from  $\alpha$ -olefins as the ethylenic double bond is conjugated with a phenyl ring in the aromatic vinyl compound whereas the ethylenic double bond is isolated in  $\alpha$ -olefins such as 1-octene used in EP 0721954. As such, this difference in the electronic structure would lead to a corresponding difference of copolymerizability of the aromatic vinyl compounds as compared to  $\alpha$ -olefins.

EP 0721954 merely lists several vinyl compounds together with  $\alpha$ -olefins. However, EP 0721954 fails to disclose or suggest that the aromatic vinyl compounds act as a comonomer that would be equivalent to the exemplified  $\alpha$ -olefin (i.e., 1-octene). In view of the art recognized differences in chemical properties, there can be no reasonable basis for the artisan to conclude and/or expect based on this disclosure that there would be a reasonable expectation of success. Moreover, in view of these chemical differences, it would not be obvious to the skilled artisan to expect that the catalyst of EP 0721954 used in the olefin-olefin copolymerization is equally applicable to the claimed method, i.e., an  $\alpha$ -olefin-aromatic vinyl copolymerization.

MPEP §2142 states: "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation... to modify the

reference... Second, there must be a reasonable expectation of success. Finally, the prior art reference... must teach or suggest all the claim limitations.” As stated above, EP 0721954 certainly fails to provide a reasonable expectation of success and as such a *prima facie* case is lacking.

Applicants further note that Claim 19 is limited to a scenario in which both of Y<sup>1</sup> and Y<sup>2</sup> are substituted or unsubstituted alkylene groups. In Examples 1-3 and 6, an alkylene/silylene bis-bridged catalyst is employed to provide the copolymerization activity of 101, 114, 46, or 101 kg/g-Zr/hr, while alkylene/alkylene bis-bridged catalysts are used in Examples 4-5 and 7 to provide the copolymerization activity of 517, 145, or 879 kg/g-Zr/hr. The alkylene/silylene bis-bridged catalyst of Examples 1-3 and 6 is identical to the catalyst A-5 of EP 0721954. Accordingly, it can be surmised that the alkylene/alkylene bis-bridged catalysts exhibit an unexpectedly high copolymerization activity as compared to the alkylene/silylene bis-bridged catalyst. EP 0721954 merely recites the alkylene/alkylene bis-bridged catalysts and the alkylene/silylene bis-bridged catalysts among a list of alternative catalysts; however, EP 0721954 does not exemplify an alkylene/alkylene bis-bridged catalyst. Accordingly, there can be no reasonable basis to conclude from the disclosure of EP 0721954 that there would be an expectation of the advantageous properties flowing from the catalyst of Claim 19. Therefore, Claim 19 is certainly unobvious in view of EP 0721954.

Applicants request withdrawal of this ground of rejection.

Application Serial No.: 09/926,742

In response to the Office Action mailed March 4, 2003 and further to the Notice of Appeal filed August 4, 2003

Applicants submit that the present application is now in condition for allowance.

Early notification of such action is earnestly solicited.

Respectfully submitted,

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In re Jones (CA FC) 21 USPQ2d 1941

**In re Jones**

**U.S. Court of Appeals Federal Circuit  
21 USPQ2d 1941**

**Decided February 28, 1992  
No. 91-1380**

**Headnotes**

**PATENTS**

**1. Patentability/Validity -- Obviousness -- Relevant prior art -- Particular inventions  
(§ 115.0903.03)**

Claimed novel salt of acid commonly known as "dicamba" is not so closely related in structure to substituted ammonium salts disclosed in prior patent as to be prima facie obvious, since claimed salt is primary amine with ether linkage, whereas diethanolamino salt disclosed in reference patent is secondary amine without ether linkage, since claimed salt is plainly acyclic or linear, whereas morpholino salt, which is only substituted ammonium salt of dicamba with ether linkage disclosed in reference patent, is cyclic in structure, and since isopropylamino salt disclosed in reference patent is primary amine, but has iso-structure quite different from that of claimed salt.

**2. Patentability/Validity -- Obviousness -- Relevant prior art -- Particular inventions  
(§ 115.0903.03)**

Claimed novel salt of acid commonly known as "dicamba" cannot be held prima facie obvious in



view of salts disclosed in prior patent, even though claimed salt is member of genus of substituted ammonium salts broadly disclosed in reference patent, since reference discloses potentially infinite genus of "substituted ammonium salts" of dicamba, and lists several such salts, but does not specifically disclose salt claimed in application, and since claimed salt is not sufficiently similar to those disclosed in reference as to render it prima facie obvious.

### **3. Patentability/Validity -- Obviousness -- Combining references (§ 115.0905)**

Contention that one skilled in herbicidal art would have been motivated to use, with acid commonly known as "dicamba," substituted ammonium salt such as that disclosed in two prior references does not warrant holding that claimed substituted ammonium salt of dicamba for use as herbicide is prima facie obvious, since there is no suggestion for combining disclosures of those references either in references themselves, which are directed to shampoo additives and production of morpholine, respectively, or in knowledge generally available to those skilled in art.

## **Case History and Disposition:**

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Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of Rita S. Jones, Michael T. Chirchirillo and Johnny L. Burns, serial no. 07/099,279 (the 2-(2'-aminoethoxy)-ethanol salt of dicamba). From decision upholding rejection of only claim in application, applicants appeal. Reversed.

### **Attorneys:**

Melvyn M. Kassenoff, East Hanover, N.J. (Gerald D. Sharkin and Richard E. Villa, East Hanover; Joanne M. Giesser, Palo Alto, Calif., with him on brief), for appellant.

Harris A. Pitlock, associate solicitor (Fred E. McKelvey, solicitor, with him on brief; Richard E. Schafer, of counsel), for appellee.

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**Judge:**

Before Rich, Archer, and Clevenger, circuit judges.

**Opinion Text**

**Opinion By:**

Rich, J.

Rita S. Jones et al. (collectively Jones) appeal from the April 15, 1991 decision of the Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (Board), Appeal No. 90-1920, sustaining the rejection of claim 1, the only claim of application Ser. No. 07/099,279, titled "The 2-(2'-Aminoethoxy) -- Ethanol Salt of Dicamba," as unpatentable under 35 USC 103. We conclude that the PTO has not presented a *prima facie* case of obviousness, and therefore *reverse*.

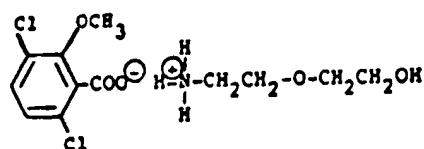
***The Invention***

The Claimed invention is a novel salt of 2-methoxy-3, 6-dichlorobenzoic acid, which acid is commonly referred to as "dicamba." A known herbicide, dicamba has typically been sold in the form of its known dimethylamine salt.

The sole claim of the application on appeal reads:

1. The 2-(2'-aminoethoxy) ethanol salt of dicamba.

The claimed salt has the following structure:



***The Rejection***

Claim 1 stands rejected as obvious in view of the combined teachings of the following references:

Richter, U.S. Patent No. 3,013,054, Dec. 12, 1961

Moyle et al., U.S. Patent No. 3,056,669, Oct. 2, 1962

Balassa, U.S. Patent No. 3,725,031, Apr. 3, 1973

Zorayan et al., 88 *Chem. Abstracts* No. 52300j, 1978

Wideman, 86 *Chem. Abstracts* No. 43711a, 1977

Richter, which all agree is the closest prior art, discloses dicamba in free acid, ester, and salt forms, for use as a herbicide. Among the salt forms disclosed are substituted ammonium salts, a

genus which admittedly encompasses the claimed salt. Richter does not specifically disclose the claimed 2-(2'-aminoethoxy) ethanol salt, however. Most notably, Richter discloses (emphasis and bracketed word ours):

Compositions in which X is substituted ammonium are amine salts of 2-methoxy-3, 6-dichlorobenzoic acid [dicamba] and are prepared by the addition of the free acid to various amines. Typical amines which can be used to prepare such amine salts are dimethylamine, trimethylamine, triethylamine, diethanolamine, triethanolamine, isopropylamine, morpholine, and the like. *The resulting products are, respectively, the dimethylamino, trimethylamino, triethylamino, diethanolamino, triethanolamino, isopropylamino, and morpholino salts of 2-methoxy-3, 6-dichlorobenzoic acid.*

Zorayan teaches the amine (H [inf 2] N (CH [inf 2] CH [inf 2] O) [inf 2] H) used to make the claimed salt, as well as the use of that amine in the preparation of surfactants for shampoos, bath preparations, and emulsifiers.

Wideman also teaches the amine disclosed in Zorayan.

The content of the remaining references is unnecessary to our decision.

The Board upheld the examiner's rejection of claim 1 as obvious, finding that the claimed 2-(2'-aminoethoxy) ethanol salt of dicamba and the diethanolamine salt of dicamba specifically disclosed by Richter were "closely related in structure," and that based upon the expectation that "compounds similar in structure will have similar properties," a *prima facie* case of obviousness had arisen. The Board found that Jones' rebuttal evidence (Rule 132 declarations and data reported in the specification) failed to "compare the claimed subject matter with the closest prior art," and accordingly did not serve to rebut the *prima facie* case. This appeal followed.

### Analysis

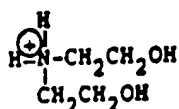
The Solicitor contends that the claimed salt falls within the genus of substituted amine salts of dicamba disclosed by Richter, and that, like Richter's genus, the claimed compound has herbicidal activity. Thus, the Solicitor urges, under the circumstances of this case, (1) the genus/species relationship and (2) the common utility of the claimed and prior art compounds support the Board's holding of *prima facie* obviousness. Moreover, the Solicitor adds, although the claimed compound is neither a homolog nor a position isomer of those salts specifically disclosed in Richter, it is structurally similar thereto, particularly the diethanolamino salt noted by the Board.

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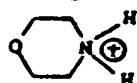
The question of "structural similarity" in chemical patent cases has generated a body of patent law unto itself. 1 Particular types or categories of structural similarity without more have, in past cases, given rise to *prima facie* obviousness; see, e.g., *In re Dillon*, 919 F.2d 688, 692-94, 16 USPQ2d 1897, 1900-02 (Fed. Cir. 1990) (tri-orthoesters and tetra-orthoesters), *cert. denied*,

\_\_\_ U.S. \_\_\_, 111 S. Ct. 1682 (1991); *In re May*, 574 F.2d 1082, 197 USPQ 601 (CCPA 1978) (stereoisomers); *In re Wilder*, 563 F.2d 457, 195 USPQ 426 (CCPA 1977) (adjacent homologs and structural isomers); *In re Hoch*, 428 F.2d 1341, 166 USPQ 406 (CCPA 1970) (acid and ethyl ester). However, none of these types of structural similarity are involved here. And in any event, this court has previously stated that generalization is to be avoided insofar as specific structures are alleged to be *prima facie* obvious one from the other. *In re Grabiak*, 769 F.2d 729, 731, 226 USPQ 870, 872 (Fed. Cir. 1985).

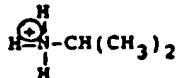
[1] On the basis of the record before us, we cannot sustain the Board's conclusion that the claimed salt and the diethanolamino salt disclosed by Richter are so "closely related in structure" as to render the former *prima facie* obvious in view of the latter. The claimed salt is a primary amine with an ether linkage. The diethanolamino salt disclosed by Richter is a secondary amine, without an ether linkage:



In addition, the only substituted ammonium salt of dicamba expressly disclosed by Richter having an ether linkage is the morpholino salt, which is *cyclic* in structure:



The claimed salt is, plainly, *a* cyclic; i.e., linear. Lastly, while the isopropylamino salt disclosed by Richter is a primary amine, as is the claimed salt, its iso- structure is quite different:



[2] The lack of close similarity of structure is not negated by the fact that the claimed salt is a member of Richter's broadly disclosed genus of substituted ammonium salts of dicamba. The Solicitor contends that "[t]he relative size of the genus disclosed by the prior art would not appear to be a controlling factor in determining whether a *prima facie* case of obviousness exists for a species encompassed within the described genus," citing *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 806-09, 10 USPQ2d 1843, 1845-48 (Fed. Cir.), *cert. denied*, \_\_\_ U.S. \_\_\_, 110 S. Ct. 498 (1989). We decline to extract from *Merck* the rule that the Solicitor appears to suggest -- that regardless of how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it. In *Merck*, at issue on appeal was whether claims to a composition of two diuretics, amiloride and hydrochlorothiazide, present in a particular "medically synergistic" weight ratio, would have been obvious in view of a specific prior art disclosure of amiloride in combination with hydrochlorothiazide, one of 1200 such combinations disclosed in the prior art reference. *Id.* at 806, 10 USPQ2d at 1845. Based on the facts before it, including evidence at trial that the experimentation needed to arrive at the claimed dosage was "nothing more than routine," *Id.* at 809, 10 USPQ2d at 1847, the court affirmed the trial court's determination of obviousness. In contrast, though Richter discloses the potentially infinite genus of "substituted ammonium salts" of dicamba, and lists several such

salts, the salt claimed here is not specifically disclosed. Nor, as we have explained above, is the claimed salt sufficiently similar in structure to those specifically disclosed in Richter as to render it *prima facie* obvious. Every case, particularly those raising the issue of obviousness under section 103, must necessarily be decided upon its own facts.

[3] The Solicitor points out that, given the breadth of forms of dicamba (free acid, ester, or salt) disclosed by Richter as having herbicidal utility, one of ordinary skill in the art would appreciate that the dicamba group has significance with respect to imparting herbicidal activity to dicamba compounds. Thus, the Solicitor contends, one skilled in the art would have been motivated to use, with dicamba, substituted ammonium salts made from a known amine, such as the amine disclosed by Zorayan and Wideman, and would have expected such a salt to have herbicidal activity. Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must be some sug

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gestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598-99 (Fed. Cir. 1988). We see no such suggestion in Zorayan, which is directed to shampoo additives, nor in Wideman, which teaches that the amine used to make the claimed compound is a byproduct of the production of morpholine. Nor does the broad disclosure of Richter fill the gap, for the reasons discussed above.

Conspicuously missing from this record is any *evidence*, other than the PTO's speculation (if it be called evidence) that one of ordinary skill in the herbicidal art would have been motivated to make the modifications of the prior art salts necessary to arrive at the claimed 2-(2'-aminoethoxy) ethanol salt. See *Gabiak*, 769 F.2d at 731-32, 226 USPQ at 872 ("[I]n the case before us there must be adequate support in the prior art for the [prior art] ester/ [claimed] thioester change in structure, in order to complete the PTO's *prima facie* case and shift the burden of going forward to the applicant."): *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984) ("The prior art must provide one of ordinary skill in the art the motivation to make the proposed molecular modifications needed to arrive at the claimed compound.")

### **Conclusion**

We conclude that the PTO did not establish a *prima facie* case of obviousness, and thus did not shift to Jones the burden of coming forward with unexpected results or other objective evidence of non-obviousness. Accordingly, the decision of the Board is *REVERSED*.

### **Footnotes**

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Footnote 1. *See generally* Helmuth A. Wegner, "Prima Facie Obviousness of Chemical Compounds," 6 *Am. Pat. L. Assoc. O. J.* 271 (1978).

**- End of Case -**